

To: Way, Steven[way.steven@epa.gov]
From: Sorrenson - DNR, Allen
Sent: Wed 4/15/2015 11:57:10 PM
Subject: Re: Red and Bonita - Piezometer Comparison

Thanks Steve, after doing a little research, I'd favor the Geokon 4500HD and 4-channel datalogger. We'd need about 300 feet of cable. We will not be trying to service the unit through the sampling pipe, as this is a one-time installation, and it will work until it doesn't. We don't need telemetry, I don't think, we can just connect a laptop to the datalogger periodically and download the pressure data. -Allen

On Mon, Apr 13, 2015 at 9:37 PM, Way, Steven <way.steven@epa.gov> wrote:

Allen - heading to ND tomorrow and didn't want to forget to share this.

Steve

Sent from my iPhone

Begin forwarded message:

From: "Petri, Elliott" <Elliott.Petri@WestonSolutions.com>
To: "Way, Steven" <way.steven@epa.gov>
Cc: "Christner, Jan" <Jan.Christner@WestonSolutions.com>
Subject: Red and Bonita - Piezometer Comparison

Hi Steve,

Below is a comparison of the two vibrating wire Piezometers you sent me and an additional USA based company I found and researched:

| Description | RST – VW2100- HD | DGSI – Heavy Duty 52610550 | Geokon – 4500Ti | Geokon – 4500 HD |
|---------------------------|-----------------------------|-------------------------------|---------------------------------------|-----------------------------|
| Range | 50 – 1450 psi | 50 – 500 psi | 150 – 1000 psi | 150 – 1000 psi |
| Resolution | 0.025 % Full Span (F.S.) | 0.025 % Full Span (F.S.) | 0.025 % Full Span (F.S.) | 0.025 % Full Span (F.S.) |
| Accuracy | 0.1% F.S. | 0.3% F.S. | < 0.5 % F.S (0.1 % F.S. available) | 0.1% F.S. |
| Operating Temp | -20 – 80 °C | <i>Not Reported</i> | -20 – 80 °C | -20 – 80 °C |
| Diaphragm Displacement | < 0.001 cc at F.S. | <i>Not Reported</i> | < 0.001 cc at F.S. | < 0.001 cc at F.S. |
| Thermal Zero Shift | < 0.05% F.S./ °C | <i>Not Reported</i> | < 0.05% F.S./ °C | < 0.05% F.S./ °C |
| Materials | Stainless steel | Stainless steel | Titanium (for | Stainless steel |

| | | | | |
|-----------------------------------|---|------------------------------|---|---------------------------------|
| Thermistor | +/- 0.2 °C | +/- 0.2 °C | Acidic conditions) <i>Not reported</i> | <i>Not reported</i> |
| Interchangeability | | | | |
| Thermistor | 0.1°C | <i>Not reported</i> | <i>Not reported</i> | <i>Not reported</i> |
| Resolution | | | | |
| Filter | 50 micron sintered filter | 50 micron sintered filter | <i>Not reported</i> | <i>Not reported</i> |
| Dimensions (Diameter x Length) | 0.75" x 5.75" | 1.125" x 7.5" | 1.0" x 5.0" | 1.5" x 8.0" |
| Cable | Heavy Duty with thick Poly- Urethane Jacket | Steel Armored | Blue PVC Cabling (1/4" dia) | Steel Armored (1/2 inch dia) |
| Multi-Channel Data logger | 10 Channel and 40 Channel | 4 Channels | 4 and 16 Channels | |

Here is the cost estimate for the different units:

| Description | RST – VW2100- HD | DGSI - Heavy Duty 52610550 | Geokon 4500 Ti | Geokon 4500 HD |
|---|---|-------------------------------|---|------------------------|
| Piezometer | \$ 795 | \$ 582 | \$ 1730 | \$ 580 |
| Cabling | \$ 1.32/ft (\$4.35/m) | \$2.15 / ft - Armored | \$ 0.79 / ft – PVC | \$ 1.83 / ft – Armored |
| Data Logger (note the thermistor takes a separate channel) | 1 Channel – \$575 10 Channel – \$1365 40 Channel – \$2650 | 4 Channel - \$1,400 | 4 Channel – \$ 1,140 16 Channel – \$ 1,850 HD would need a patch cable, available in USB and RS32 connectors | |

The Geokon appears to meet the requirements and is USA based. One issue I noted is that is the diameter of all of the units is 0.75" diameter or greater and the pipe specified in the bulkhead drawings is a 0.75" dia schedule 40 stainless steel pipe. That means the units couldn't be serviced or replaced through the existing conduit.

I spoke with John Lucotch about telemetry alternatives, and he will work on some

different options for what can be done at the site. However, he is out of the office for the birth of his baby for the next week.

Please let me know if you have questions or need any additional information on these Piezometers.

Thanks,

Elliott

Elliott Petri, PE

Weston Solutions, Inc.

1435 Garrison St, Ste 100

Lakewood, CO 80215

Ph: 303-729-6156

Cell: 719-216-2754

Fax: 303-729-6101

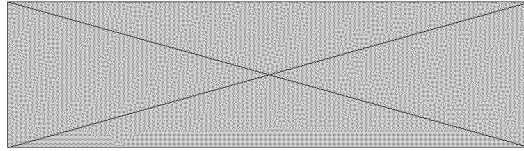
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Allen C. Sorenson

Project Manager/Geological Engineer

Inactive Mine Reclamation Program



P 303.866.3567x8143 | F 303.832.8106 | C 303.263.7886

1313 Sherman Street #215, Denver, CO 80203

allen.sorenson@state.co.us | www.mining.state.co.us